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Birds in Relation to Agriculture

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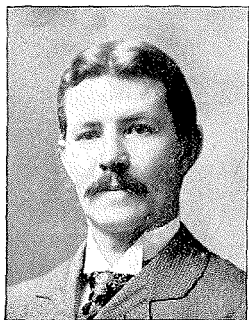
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BIRDS IN RELATION TO AGRICULTURE

By F. H. HALL

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Without the birds, country life would indeed be barren to any lover of animate activity. No longer do deer, bears, wolves, wild cats or beavers send thrills of interest, anger or fear into the hearts of New York farmers or farmers' boys. Fox, 'coon, mink, fisher, otter and weasel have been exterminated or have become so rare that the advent of any one of them in field or henyard is the surprise of a

decade. The larger squirrels, even, have been driven from the smaller woodlots to the tree-clad hillsides or the large forests. A few small squirrels and chipmunks, the much maligned but useful skunks, "Molly Cottontails," a stupid wood-chuck or so on some sandy hillside, the ever-present and annoying, but usually invisible, rats and mice, bats and shrews, beneficial but much abused, the muskrats in the ponds and the moles in their hidden pathways, are all that are now left us of the teeming mammal life that supported the Indian and made the days of farmers, a few generations ago, an alternation of conflict with animal enemies and enjoyment of their presence and activities.

Birds still remain. Not all of them; for the passenger pigeon has utterly disappeared — that "wild pigeon" once flying in flocks that hid the sun and nesting in roosts so crowded that large trees broke beneath their burden of birds and nests. The wild turkey no longer struts and gobbles in forest and glade. The wood-duck has nearly vanished — the most beautiful of American water-fowl, which the farmer of New York State might hope occasionally to find nesting in his water-side woodlot. Neither can the country lad, in search of some new thrill, count any longer on finding common along the wet edges of the wood the deep-bored tubes of the woodcock; nor hunter, desirous of that best test

of the quickness of his aim, flush regularly this erratic flier in his familiar haunts. Bob-whites, in most parts of the state, now no more sound their pretty call; and the larger ruffed grouse, or "partridge" of the farm boy, while still to be found in small numbers, is confined mostly to the wooded hillsides. In these two birds the farmer loses valuable allies in his conflict with grasshoppers, crickets and similar meadow, pasture and grain-field pests; but in many parts of the state the pheasant is replacing the partridge, perhaps to the farmer's disadvantage since he pulls some corn, but much more likely to his benefit as the pheasant is more a bird of the open fields than the ruffed grouse, and is said to be fond of potato beetles, a useful trait missing in the older native bird.

Yes! Thankfully we say it, birds still remain. In spite of the prowling house cat and her marauding semi-wild relatives of roadside and woodland, with their insatiable appetite for small birds; in spite of the market hunter and the foreigner out with his shotgun on Sunday, with his idea of unlimited license in this "Land of Liberty;" in spite of the lady—pardon the name—in spite of the lady of fashion who, to add a few bright feathers to her hat, does not hesitate even at the horrible barbarities of aigrette hunters—the agonized deaths of mother herons and the pitiful starvation of nestlings caused by this unhallowed pursuit; in spite of crows, red squirrels and small boys, each with a passion for egg collecting; in spite of all these and many other destructive agencies, Mother Nature has still preserved for us representatives of most of our bird species; so that with each returning spring we can enjoy the bubbling trills of the sparrow, brown thrasher and bobolink, the "cheerily" call of the bluebird, the boisterous song of the robin, the chatter of the blackbird, the drumming of the flicker and the startling courting screams of the hawks. We can still see the stately geese following the ice-line to the North, can catch the sun reflected from the meadow-lark's breast, can delight the eye with the brilliance of the tanager and the bright contrasts in plumage of oriole and red-breasted grosbeak; and those of us who happen to be sufficiently alert can riot in the striking color combinations of the warblers who give us the treat for a little time in May and then take to

Canada and the cold North the suggestions of tropical coloring they bear.

Through the summer our familiar friends remain, practically unchanged in kind, if reduced in number, from the times of Audubon and Wilson, adding incalculably to nature's charms for those who delight in graceful activity. And even when winter holds us in an icy grasp, many birds may be found in the forests, sheltering pine trees or hedges about the farms, and even in our door-yards. The downy and hairy woodpeckers still continue their faithful search for grubs and borers in the trees, the nut-hatch joins them in a topsyturvy scramble round the trunks, the brown-creeper works in steadily ascending spirals up the shaggy stems, searching beneath each flake of bark for some hidden bug or beetle that only his curved beak could dislodge, possibly a few kinglets may add to the company their tiny bodies, each with a crown of gold, while the sociable little chickadee with his cap of black is sure to greet the human visitor with a friendly glance and merry greeting. In the fields the juncos may remain, with their representation of a typical winter day, leaden sky above and snow-clad ground beneath, and the tree sparrows will surely be somewhere about, busy at their helpful task of weed-seed destruction. Frequently, but not regularly, the snowflakes and long-spurs aid the tree sparrows in this most useful work, coming in such flocks that they may do in an hour what the sparrows would be busy over for a week. Owls do not leave us with winter, but they are so shy that one not familiar with their haunts is most pleasantly surprised if some "great barred" shadow or his "snowy" brother from the North flits noiselessly across the path. The melancholy call of these birds of Minerva is one of the features of late winter and early spring, pleasant or the reverse, according to the hearer's idea of these mysterious forest friends of ours. A few song sparrows may also stay with us and an occasional robin; while within sight of water open in winter we may see as many kinds of water-fowl as of land birds.

Thus the birds add a gladsome touch to country scenes at all times of the year, delighting both eye and ear; and for this alone they deserve all the protection and encouragement we can give them; for, with but exceedingly few exceptions, they do little harm and gain their living from products man could never use.

But I wish to present to those who dwell in the country and make agriculture their life work a stronger appeal — a plea for the maintenance of bird life, supported by facts and figures that prove them an economic asset of every farm. In giving these facts I shall draw but little upon my own observation or study; for every bird-lover is apt to be prejudiced and see only good in the feathered world; while many dwellers on farms, especially if they raise fruit on which robins and catbirds sometimes levy heavy toll, or if they are poultrymen and unwillingly give (or think they give) the hawks and owls a few prize chickens, are liable to think birds a nuisance. I shall present testimony — only the smallest fraction of what might be offered — from those who have made bird study a business, and who have sought to collect and weigh the evidence on both sides. For the bird question, even to-day, undoubtedly has two sides. So complex are the relations of nature's forces and creatures, that it is extremely difficult to fix the limit of good or ill from any single source; and the difficulty becomes still greater when we join man's complicated interests to the conflicts already existent in the relations of plants, animals, birds and insects.

Birds serve as regulators of insect activity. It is doubtful whether they could ever control, alone, an outbreak of some insect injurious to crops when other conditions are right for the rapid, unchecked development of that pest; and many of the insect pests notably injurious on the farm, like potato-beetle and squash bug, have few bird enemies. Some have even said that it is doubtful whether the total extermination of birds would make much difference in the numbers of insect pests from which we suffer. These anti-bird theorists have undoubtedly been misled by the failure of small numbers of birds to cope suddenly with the surprisingly rapid increase of some insect pest; while they have overlooked the real work of the birds, which is, by constant, steady warfare upon all classes of insects, to keep the number of such overwhelming outbreaks to a minimum. Entomologists well know that there are hundreds of species of insects, now restricted in numbers or finding food upon some plant of no economic importance, which might, if unrestricted in increase, find the wild food plant utterly insufficient for the increased numbers of the insects and become devastating pests of farm crops. The birds

and other agencies usually control such species, keeping them within safe limits. Occasionally conditions are just right and we have tent-caterpillar years or outbreaks of tussock moths; but the checks soon operate again, and the pest returns to its normal numbers.

Other students have said that were all birds destroyed, insects would increase so fast that in seven years they would consume every green plant on the face of the earth. This is an exaggeration just as great in the opposite direction; for with the increase of the insects, repressive agencies, other than birds, like parasitic insects and diseases, would find developmental conditions favorable and prevent such rapid increase.

But birds *do* make every effort to control insect or animal outbreaks; of course, not consciously as friends of man, but merely because they thus find food more easily and abundantly.

During an invasion of an Illinois apple orchard by canker-worms, Professor S. A. Forbes made a study of the stomach contents of many birds working in the orchard and found that practically all were increasing their bill of fare by canker-worms, most of them without neglecting their diet of other injurious species. The canker-worms served as dessert after the principal meal on other species, or the reverse. Twenty per cent. of the food of robins was canker-worms, 28 per cent. cutworms and 14 per cent. vine chafers; of catbirds, 15 per cent. of the food was canker-worms, 10 per cent. cutworms and other caterpillars, 14 per cent. ants and 33 per cent. vine chafers. Bluebirds took 36 per cent. of vine chafers and 12 per cent. of canker-worms; chickadees ate only canker-worms and beetles; house wrens made half their diet of the canker-worms. Warblers took from half to three-quarters of their food from the same source; while seven cedar waxwings (cherry birds!) had made practically all their meal upon the canker-worms. From 70 to 100 worms were found in each of these seven stomachs, so that, even if this was the food of the bird for the whole day, not a fair supposition as later facts will show, the 30 waxwings in the flock from which the seven were shot were destroying 3,000 worms a day, or 90,000 during the month of exposure of the canker-worm.

Passing down through the list of birds shot, canker-worms were

found in the stomachs of sparrows, orioles, kingbirds, flycatchers, cuckoos and woodpeckers, and the percentage of injurious insects in the food ranged from one-third to over nine-tenths.

In Nebraska during the Rocky Mountain locust (grasshopper) outbreaks, Professor Samuel Aughey found large numbers of locusts in the stomachs of birds examined. Robins averaged 44, thrushes 22, catbirds 30, bluebirds 22, one kinglet 29, titmice 62, chickadees 53, nuthatches 23, warblers of four species 18 locusts each and 19 other insects, swallows of four species 33, bobolinks 14, meadow-larks 24, one blackbird 51, night-hawks 50, cuckoos 42, woodpeckers of five species 29 locusts and 25 other insects, owls of three species 32, hawks 42, buzzards 64, sage cocks 47; while orioles, ravens, crows, magpies, blue jays, pigeons, grouse, prairie-hen, quail, golden plover, snipe, sandpipers, godwits, tattlers, curlews, great blue herons, bitterns, sand-hill cranes, rails, coots, geese, ducks, pelicans and gulls, all came to join the feast from prairie, forest, air, shore, sea and inland lake, and even a tiny humming-bird (caught by a cat) was examined and found to have eaten four immature 'hoppers.

It is not alone insect outbreaks that attract birds, for an invasion of vermin is almost certain to be followed by increased numbers of birds of prey that feed upon such animals. An old English chronicle says that in 1581 mice appeared in countless numbers on grazing marshes in the counties of Essex and Kent, so that the pasturage was destroyed and the cattle appeared as though stricken with disease. No measures of control of man's devising were effective, but owls collected on the marshes from all the country about, and the marsh owners were "shortly delivered from the vexation of such mice." This invasion was repeated in 1648 and similarly checked; and in 1754, a correspondent of the *Gentleman's Magazine* wrote of another district of England, that a plague of mice recurring every six or seven years and "destroying the corn of every kind" was regularly followed by a "prodigious flight of Norway owls" which remained until the mice were destroyed. Mr. W. H. Hudson, in "The Naturalist in La Plata," speaks of the suppression of a mouse plague by storks and short-eared owls.

What might be regularly done by birds in controlling the com-

mon insect pests is shown by an experiment made by Professor Forbush, of Massachusetts. He came into possession of an old orchard in which insects and diseases had had full sway and had prevented the production of perfect fruit for many years. He protected the birds in this orchard by excluding so far as he could cats, boys and other enemies, and sought to attract additional birds by feeding and supplying nesting places. He watched the birds at work during the winter of 1894-5 and the following summer, and noted their destruction of fall and spring canker-worms, tent-caterpillars, codling moth, scales and other enemies of trees and foliage. The protection granted the birds was appreciated, and their numbers increased in spite of destructive agencies beyond Professor Forbush's control. The season was one of notable outbreaks of both tent-caterpillars and canker-worms, and practically all orchards of the township were defoliated and barren. The bird-protected orchard bore luxuriant foliage throughout the season and produced a good crop of fruit. The orchard of a neighbor adjoining and partly protected by the birds attracted to the Forbush orchard, also bore some fruit, but these two were the only ones in the neighborhood to give a harvest. This experiment was continued for several seasons with the result that the trees have been kept free from foliage-eating insects without spraying or other artificial protection, merely by protecting and encouraging birds. Of course, codling moth and apple-fruit maggot cannot be controlled by birds, since they feed beyond reach, but most other apple pests would be kept well under were birds as plentiful as they should be in orchards.

Other illustrations of this constant protective influence of birds are shown when bird life is accidentally or purposely reduced to a minimum. The King of Prussia was very fond of cherries and was so annoyed by the destruction of those on his trees by birds that he ordered the birds exterminated. The work was well done, and nearly all the sparrows and many other birds were killed and the others driven away. Within two years cherries and other fruits were wanting, the trees were seriously defoliated, and the king went to considerable expense to import small birds to replace those he had ordered killed.

Late in the eighteenth century woodpeckers and titmice for some reason disappeared from a large German forest, and within

a few years many of the trees began to die from the attacks of the larvae of a wood-boring beetle which had increased amazingly when its bird enemies gave opportunity. In Belgium a large park was cleared of sparrows, which had come in great and annoying numbers the previous year because of an unusual supply of insect food. The following season the park again swarmed with insects, and the trees were practically defoliated by crawling ravagers, particularly the gypsy moth caterpillar.

In 1861, French harvests were so poor that a commission was appointed through the Minister of Agriculture to ascertain the cause. This commission employed experienced naturalists, whose investigations proved the crop shortage due largely to insect devastations. The insects had increased to this alarming extent because the French people then made a practice of killing for food not only game birds, but song birds as well. Guns, snares and traps had been in constant use all over the country; and even the eggs had been systematically collected, a single child having been known to bring in as many as 100 eggs at night. It was estimated that from eighty to one hundred million bird's eggs were destroyed each year. In consequence, some species of birds had already disappeared and others were rapidly diminishing; and, apparently as a result of the lessened numbers of birds, the vines, fruit trees, forest trees and grain fields, all suffered greatly from injurious insects. In one department (corresponding to one of our states) the value of the wheat destroyed was estimated at one million dollars. The commission recommended prompt and energetic measures to stop the slaughter and called on clergy and teachers to aid in showing the bird destroyers the harm they were doing.

In our own country, though the relation of cause and effect is not so clearly established, it is known that the greatest losses from grasshoppers followed the destruction by pioneers and plainsmen of countless thousands of blackbirds, prairie-chickens, quail, upland plover, curlew and other birds. By poison and in other wholesale ways, birds were killed in and about the grain fields in such numbers that their bodies were collected in piles. In one county alone 30,000 birds, mostly blackbirds, were destroyed; while it is estimated that from an area of thirty counties, 450,000 quail and prairie-chickens were sent to market. This

slaughter began about 1865 and continued up to the time of the most serious locust outbreaks twelve years later. Is it unfair to assume that the locusts would have been less destructive if the birds had remained? Professor Aughey says in regard to the killing of 30,000 birds in one county: "Supposing that each of these birds averaged one hundred and fifty insects each day, we then have the enormous number of one hundred and thirty-five million insects saved in this one county alone that ought to have been destroyed through the influence of birds. When we reflect, further, that many of these birds were migratory, and that they helped to keep down the increase of insects in distant regions, the harm that their destruction did is beyond calculation. The killing of such birds is no local loss; it is a national, a continental loss."

To many farmers the loss of a few hills of corn, a quart or so of cherries or an occasional small chicken condemns birds; and to any suggestions that these same birds may be of more use than harm, the contemptuous answer is made, "How much good can a few little thieves like those do?" The amount of food needed by even the smallest bird is great. Birds are more active than mammals, they grow faster, live faster, breathe faster, their temperature is higher, their blood circulates faster and they must, therefore, eat more food and digest it more quickly than do animals. Especially when raising its young must the life of the bird be a very whirlwind of activity, for it must then supply, not from a reserve stored up in its own body but from material freshly gathered, enough food to build in from ten days to three weeks, from a weight expressed in fractions of an ounce to that of its own body or greater, from two to five nestlings. Only from condensed, palatable, easily-digested sources is it at all possible for the two parents to supply this amount of food; so we find that all birds, even those which as adults live on grains and seeds, depend largely on worms, caterpillars, insects and small animals for the demands of their young. For this reason, even the worst grain thieves often do much good during a certain period of their lives and make us hesitate before we condemn them offhand and finally.

Birds digest rapidly. By ten careful experiments with two

birds, young crows were found to digest insects' eggs and pass the shells in less than an hour and a half, all of the food being disposed of in less than two hours. Cedar-birds passed the pits of black cherries in 45 minutes, while blackberries were digested in half an hour. The excrement of a thrush showed the stain of blueberries one hour and thirty-two minutes after the food was eaten.

Birds grow rapidly. Weed and Dearborn report that four young sparrows watched by them were out of the nest on the eighth day, and others record similar rapid development, although this is somewhat unusual. During one day a family of five song sparrows gained 48 per cent. in weight, while the smallest of the five did 5 per cent. better than to double his weight. My own family and myself left home, leaving a yellow warbler's nest in the vines on our front porch with eggs about ready to hatch. When we returned two weeks later, the young warblers had left the nest, thus depriving me of an expected opportunity for near-at-hand study.

Birds eat heartily. It is difficult to tell just how much food wild birds get and unfair to estimate the food of birds in nature from those in captivity, but the following facts and figures are at least suggestive of the quantity of insects, seeds, fruits and animals a growing bird family requires, and how active the parents must be to secure such amounts. Professor Herriek saw three young redwing blackbirds fed 40 times in four hours on one day, and 43 times in three and a half hours on another day. Four nestling kingbirds were fed 91 times in four hours; and two red-eyed vireos — small birds — took grasshoppers, katydids, green larvae, beetles, bugs of many kinds, or berries once every 15 minutes during two days and once every nine minutes the third day. Four young catbirds were fed 46 times in four hours.

A brood of cedar-birds watched by Weed and Dearborn ate at least 10 ounces of food apiece in 15 days, ten times their weight when they left the nest; and the same observers saw three young robins ten days old receive in two hours one bird cherry, one large cricket, one smooth caterpillar an inch and a half long, one moth, one harvest-man, one tumblebug, two earthworms, two beetles, eight spiders (probably) and 29 grasshoppers.

According to Dr. Stanley, a gull, kept and fed in a garden, devoured in one day fourteen mice and two rats. Mr. Charles W. Nash fed in the house a young robin that had fallen from its nest, and from May 21 to June 6 gave it from 50 to 70 cutworms and earthworms daily. On June 9 it weighed exactly three ounces; and it was supplied on that day with all the cutworms it would eat. It was satisfied with $5\frac{1}{2}$ ounces, nearly twice its own weight when it began to eat, or a total of 165 worms. Dr. Sylvester Judd saw a mother house-wren visit her three young 110 times in 277 minutes, bringing 111 spiders and insects. Young crows kept by Kirkland and Ballou, Professor Forbush's assistants, lost weight when each was fed daily one ounce each of tomato, corn, muskmelon and beets, five ounces of meat and 50 grasshoppers—nine ounces in all, but gained somewhat on nine ounces apiece of tomato, melon and corn, supplemented by four frogs, a salamander, and all the grasshoppers they could eat. This feeding was continued for a long time with increasing quantities of food; and as a general conclusion Professor Forbush believes that young crows after they are well developed though still growing, with their feathers fully formed, require at least one-half their own weight of food daily, while they can use more to advantage. An adult crow kept by Weed and Dearborn consumed in three days more than three-fourths of his own weight of fish, which is equivalent to over 400 grasshoppers, a common food of the crow at that season of the year. The food of mature owls can be estimated from the bones, skulls, and feathers regurgitated in the form of pellets; and from such studies Dr. Montgomery shows that four owls in 59 days ate at least 12 small birds, 10 shrews and 600 mice, on an average of two and one-third animals, mainly mice, for each owl daily. In 22 days four other owls ate one finch, one shrew and 199 mice, giving about the same average per owl daily, two and one-quarter animals. These pellets were collected under the roosting places only, and as others were probably regurgitated elsewhere, the amount of food taken was undoubtedly greater than the figures indicate.

These figures show in a general way how and why birds may benefit agriculture; but no presentation of the subject would be

at all complete that did not speak of the individual species or groups and their work; and in doing this it will be evident that some species are harmful and unworthy of protection.

Among those to which this character is commonly given are the hawks and owls, two classes, that, as a whole, are exceedingly useful. All should not suffer from the misdeeds of their few representatives who have acquired bad habits and cling persistently to them.

Very careful studies of the food habits of hawks and owls have been made by the unprejudiced scientists of the Bureau of Biological Survey of the U. S. Department of Agriculture, and they find about two or three species in each group that deserve death at the hands of New York farmers. Among hawks, the habitually predatory species are the Cooper's and sharp-skinned hawks and, occasionally, when he has located in thickly settled communities where young chickens are too temptingly plentiful, the red-tailed hawk. The goshawk and duckhawk are also on the excommunicated list, when they are found about the farm, but the goshawk rarely enters New York except in winter, and the duckhawk seldom leaves the vicinity of water.

Of the other birds of this group, the sparrow-hawk might better be called the grasshopper hawk, for where 'hoppers and crickets are abundant, these hawks congregate and rarely touch any other form of food until the supply of these insects diminishes. Then beetles, spiders, mice, shrews, small snakes, lizards and an occasional small bird fill the void left by the scanty supply of grasshoppers. The broad-winged hawk seldom attacks poultry or small birds, but confines its diet mainly to frogs, small snakes, toads, crayfish, chipmunks, red squirrels and the larger caterpillars, like those of the sphinx moth, cecropia moth and emperor moth, which so often feed upon the leaves of large trees. The rough-legged hawk is a mouse hawk, feeding almost exclusively upon meadow mice. Of 45 stomachs examined by the U. S. Department of Agriculture biologists, 40 contained mice, five contained shrews, gophers, rabbits or weasels, one contained insects and a lizard, and none contained poultry or birds of any kind. In Massachusetts hundreds of stomachs examined contained only meadow mice, and similar testimony comes from Oregon, Utah and Nebraska.

The food of 220 red-shouldered hawks, possibly the most common large hawk in western New York, was found to consist of 65 per cent. of mice, large numbers of insects and only one per cent. of poultry; yet as "hen-hawks" these are the target of every farmer's rifle or shotgun whenever opportunity offers. The red-tailed hawk undoubtedly does more good than harm; but about 10 per cent. of the stomachs of birds of this species contained poultry or game birds, and other stomachs held remains of many other more useful birds; so that one cannot censure very severely the gunner who destroys one of them in a raid upon the hen yard. The marsh hawk, also called "hen-hawk," does rarely pick up a bird, chicken or even a small fowl, but the great majority of its victims are meadow mice, squirrels, rabbits, ground squirrels, lizards, frogs, snakes and often, for dessert, a crop full of large grasshoppers.

Against the owls the prejudice is probably fully as great as against hawks; yet really only one common member of the family, the great horned owl, is ever sufficiently injurious to deserve condemnation, and that more because it destroys the useful skunk and a few game birds than by reason of actual damage to poultry. The snowy owl of the North might be a nuisance were he about in summer, and the barred owl and long-eared owl occasionally take an unprotected chicken roosting out of doors, but the harm the two latter do is far more than counterbalanced by the good. Against the rare barn owl, the screech owl, the short-eared owl and the saw-whet owl, hardly a syllable of reproach can be uttered, while the figures given earlier prove that they are of incalculable benefit in destroying mice and larger rodents. Yet many states have offered bounties for the destruction of these friends, the hawks and owls, though probably none do so now; and in New York State practically all are now protected. Dr. C. Hart Merriam, probably one of the best-posted students of animal life in America, made a careful estimate of the effect of the Pennsylvania bounty law during its life of a year and a half. His liberal figures placed the value of all poultry destroyed by hawks and owls in Pennsylvania during the time at about \$2,000. But every hawk and owl killed would have destroyed 1,000 mice, each of which would cause farmers at least two cents damage, so that

the state paid \$90,000 to have the birds destroyed and the farmers lost \$3,850,000 worth of property through the rodents these birds would have killed, all to save a loss in poultry of less than \$2,000.

Any farmer who ignorantly destroys a hawk or an owl is running about ten chances to one of working himself or his neighbors an injury. All should learn the few injurious members of the two classes by sight and let all others alone, unless it is some individual of bad habits caught in the very act of carrying off poultry.

A bird which causes the farmer much more harm than all the hawks and owls is the cowbird. This homeless vagrant in itself probably does little or no harm, even some good, to the farmer's stock or animals; but each young cowbird reaching maturity means the death of a nest full of small birds of other species, and practically every small bird in whose nest the cowbird habitually lays eggs is an active insect destroyer or weed-seed eater and thus a friend and asset of the farm owner. Kill the cowbird.

That "rat of the air," the English sparrow, hardly deserves mention in a list of birds, so unlike most of them is it in quarrelsome disposition, slovenly home making, filthy disfiguration of buildings upon which it nests, distribution of the worst poultry diseases and parasites, impudent familiarity and general uselessness. A few good points it has, to be sure, as it eats some insects and weed seeds; but it easily makes evil all its good by destruction of grain in field and shock, and, as it drives away far better bird neighbors, it deserves extermination. For such a fate for this prolific breeder, though, we need never hope.

The crow, also, I would condemn for much the same reason. The evil crows do by pulling corn and similar destruction of property for which the farmer condemns them is undoubtedly more than made good by the killing of white grubs, grasshoppers and other insects that the crow feeds on, but the crow is a robber and murderer and destroys the young of all the small birds he can find, either in the egg or as nestlings. He is also a worse enemy of poultry than are the hawks. This sly thief often reduces the housewife's collection of chickens rapidly and secretly, but the poor hawks, if one is ever seen in the neighborhood, have to take the blame and pay the penalty. I give my full permission for

you to kill crows, but I do not anticipate that their numbers will be seriously reduced unless you are much more successful than most crow hunters I have known. The cunning rascal is well able to care for himself.

Another bird whose habits are not the best — and the only one of a considerable group that is not decidedly beneficial — is the yellow-bellied woodpecker or sapsucker. This bird is really injurious through his practice of boring holes through the bark of trees to feed upon the sweet sap and the tender growing tissues of the new wood. These holes are often so numerous and so neatly arranged in rows around the trees, that partial or complete girdling frequently occurs, and the holes afford entrance to bark diseases, making the sapsucker a menace to the orchard and forest. Fortunately he does not stay with us long in agricultural New York, but merely makes us a passing visit in spring or fall on his way north to the Adirondacks and Canada or south to warmer climes.

A few other birds are in a doubtful category. The blue jay with his crow-like theft of eggs of other birds and his quarrelsome disposition, but with brilliant coloring and lively ways that make us forgive him much; the catbird with his taste for fruit, balanced by good work on insects most of the year, his rippling song making us forget his most peevish, insistent call for "Mary" when not in the best of humor, while his ventriloquial imitations of the calls and songs of other birds make every bird lover vote for his protection. The robin, that one bird known to all, both city and country, the most common of our larger birds, is regarded with almost sentimental affection by nine-tenths of the children and women; yet the robin is occasionally a most destructive pest, and it is somewhat doubtful whether the good he does warrants unqualified protection at all times and in all places. His food habits are not above question, for with his diet of injurious or harmless insects, he takes many ground beetles that are themselves excellent "bug hunters," and he fairly feasts on earthworms, those most efficient earth miners and improvers of soil tilth. And when robins collect in flocks upon some choice cherry trees or in a berry plantation, they easily rob the fruit owner of both profit and pleasure. I believe they should be classed with rabbits in

protection laws, and their destruction by any means allowed the owner of fruit they are ruining.

With these few exceptions, all our birds deserve protection and encouragement; for we find in the noble band a body of police, vigilant and eager in search of our enemies — insect, animal or weed. From their watchfulness not a foot of ground escapes, from doorstep to remotest woodland limit, from water-line or below it to the top of Mount Marcy. In the air birds of prey circle in their courses, from the ten-foot flight of the marsh-hawk over the meadows to the slow soaring of the rare turkey buzzard so far above us that he seems a mere speck against the blue, each in search of some crawling marauder below or some carrion that might pollute the air we breathe. About our roof tops and above them, the swallow and the swift, the night-hawk and the whippoorwill wage constant warfare against the mosquitoes, flies and gnats that so disturb our personal peace. In the vines upon our porches, in the shrubbery at the door or in some snug hole in post or tree nest the wren, the chipping sparrow and yellow warbler, each bringing from nearby lawn, garden and orchard its almost unbelievable toll of insects to feed its growing young; on the lawn work the song sparrow, robin, bluebird and grackle; in the doorway trees the vireos and fly-catchers chase the darting flies and moths; in the orchard the kinglets, creepers, woodpeckers and some of the warblers search the bark and beneath it for eggs, larvae and boring beetles; and other warblers, the finches, the thrushes, the waxwings, the tanagers, the grosbeaks, the orioles and the cuckoos try to keep twigs and foliage free from caterpillars, bud-moths, leaf-rollers and case-bearers. Behind the plow in garden and field stalk the robin, the blackbird and the crow searching for white grubs and cutworms; in the meadows and on pastures the meadow-lark and bobolink, the pheasant and the quail, the field and savannah sparrows, the killdeers and upland plovers, hunt for grasshoppers and crickets, while the sparrow-hawk sails above to capture on the wing the 'hopper that thinks to escape his enemies by flight. From the edge of the woodlot the fox sparrow, towhee, veery, oven-bird and hermit thrush make forays on the ground, while kingbird, pewee and crested flycatcher supervise the aerial realm. In the marsh edges work the swamp sparrows and marsh wrens, the redwinged blackbirds and tree swallows

and the woodcock and the snipe in spring and fall. Along the creeks and larger bush-lined ditches, the catbird loves to hide and the kingfisher rolls his startling call; and at the water's edge skulk the yellow throat, the water thrush and the little spotted sandpiper. The shrubby fence rows serve as retreats for the brown thrasher and the grasshopper sparrow; while nesting in the forests, but seeking food far afield, are the woodpeckers, now, alas, all too few. The goldfinch seeks the dandelion where'er its snowy balls are shown, and later strips the thistle's downy balloon of its load of seed; but when fall comes joins its fellow sparrows in a more prosaic hunt for seeds along weedy roadsides or in neglected fields.

Thus at practically every point upon the farm or where farm land touches forest, water or air, we have bird friends, many of them eating only that which works us harm, is useless to us in any way, or is a waste remnant of some useful crop. A few take a little toll of fruit, grain or poultry, but repay tenfold the harm they do by their faithful service against our pests. All deserve protection and encouragement. Give them nesting places and kill off the predatory cats and red squirrels that fill their lives with anger and fear. In times of stress provide a little food or drink to earn their confidence and gratitude or perchance to save them from distress and death. Teach your collection-eager youngster that stamps or old coins are far more worth his time than bird's nests or eggs, and as he gets a little older and is dying to test his rifle, show him some better mark than redheaded woodpecker or marsh-hawk. And when the lady of the household seeks a new hat, persuade her to obey our beneficent state law and not send to Philadelphia or elsewhere for heron plumes, aigrettes, or other forbidden trophies of bird slaughter.

These are all little things for any one person to do, but their general application, with the widespread education which their adoption would involve, would mean much to bird life in this state and would help at least to bring back our feathered friends in numbers that would simplify one of the perplexing problems of crop raising — the control of insects and weeds.